

Climate Change Summary, Minidoka National Historic Site, Idaho

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Climate Trends for the Area within Park Boundaries

- Average annual temperature has increased since 1950, but the trend has not been statistically significant (Figures 1, 2). Average Spring (March-May) temperature did increase at a statistically significant rate of $1.6 \pm 0.8^{\circ}\text{C}$ per century.
- Total annual precipitation (Figures 3) has increased since 1950, but the trend has not been statistically significant.
- If the world does not reduce emissions from power plants, cars, and deforestation by 40-70%, models project substantial warming and changes in precipitation (Table 1, Figure 3).
- Under all emissions scenarios, temperature and precipitation could increase substantially (Figure 4).
- Under the highest emissions scenario, models project 12-15 more days per year with a maximum temperature $>35^{\circ}\text{C}$ (95°F.) and an increase in 20-year storms (a storm with more precipitation than any other storm in 20 years) to once every 5-6 years (Walsh et al. 2014).

Historical Impact in southern Idaho

- Analyses of Audubon Christmas Bird Count data across the United States, including counts in Idaho, detected a northward shift of winter ranges of a set of 254 bird species at an average rate of 0.5 ± 0.3 km per year from 1975 to 2004, attributable to human climate change and not other factors (La Sorte and Thompson 2007).

Vulnerabilities in Southern Idaho

- Under high emissions, fire frequencies could increase up to 25% by 2100 (Moritz et al. 2012).
- Past warming has reduced mountain snowpack widely and rainfall in some areas, which may continue to reduce summer streamflow and water supplies downstream (Mote et al. 2014).
- Warmer rivers and reduced streamflow could reduce trout habitat (Wenger et al. 2011).

Table 1. Historical rates of change per century and projected future changes in annual average temperature and annual total precipitation (data Daly et al. 2008, IPCC 2013; analysis Wang et al. in preparation). The table gives the historical rate of change per century calculated from data for the period 1950-2010. Because a rate of change per century is given, the absolute change for the period 1950-2010 will be approximately 60% of that rate. The table gives central values for the park as a whole. Figures 2-4 show the uncertainties.

	1950-2010	2000-2050	2000-2100
Historical			
temperature	+0.4°C/century (+0.7°F./century)		
precipitation	+15%/century		
Projected (compared to 1971-2000)			
Low emissions (IPCC RCP 4.5)			
temperature		+2.4°C (+4.3°F.)	+3.2°C (+5.8°F.)
precipitation		+6%	+8%
High emissions (IPCC RCP 6.0)			
temperature		+2.1°C (+3.8°F.)	+3.6°C (+6.5°F.)
precipitation		+6	+12%
Highest emissions (IPCC RCP 8.5)			
temperature		+3.1°C (+5.6°F.)	+5.5°C (+9.9°F.)
precipitation		+8%	+14%

Figure 1.

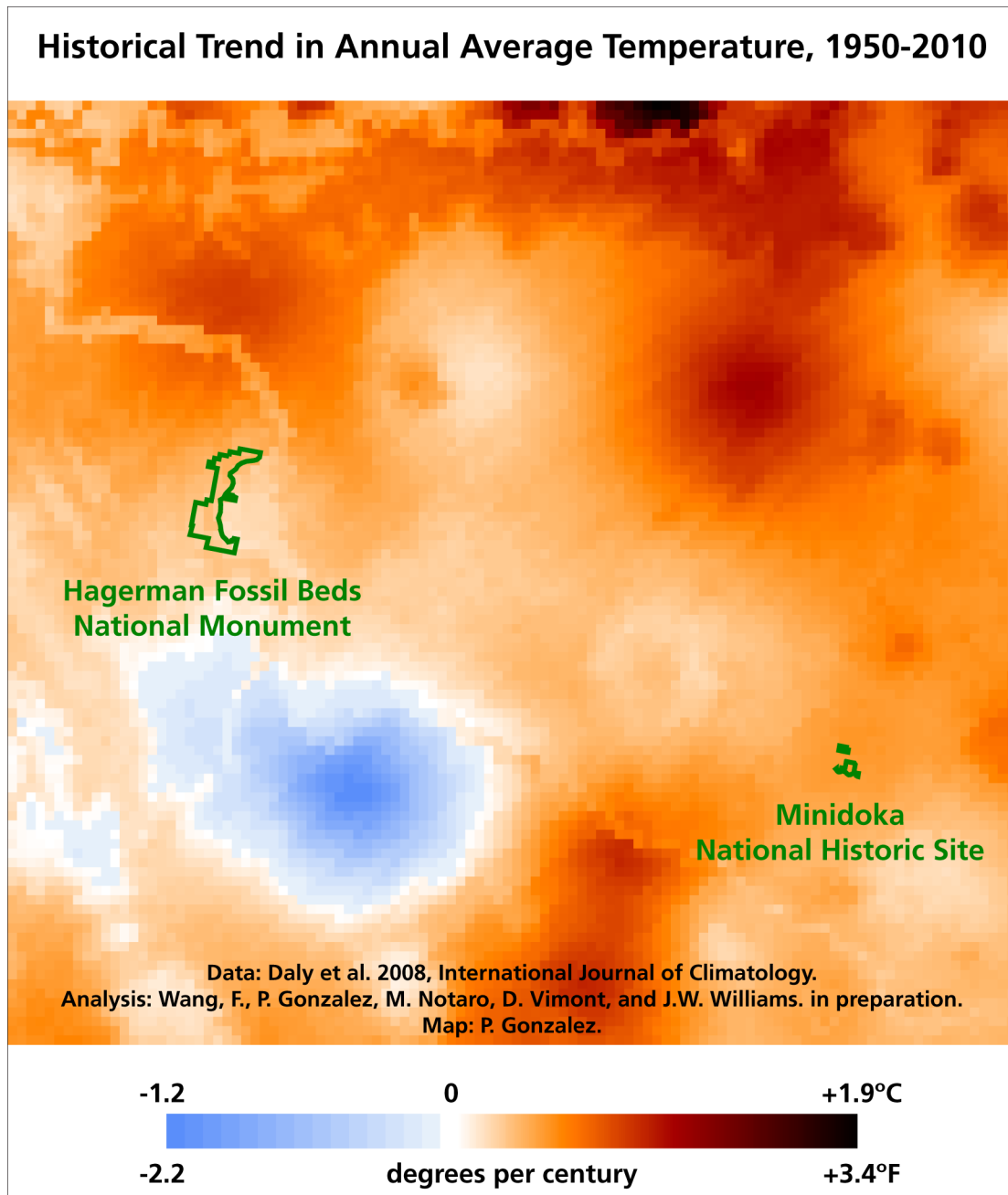


Figure 2. Historical annual average temperature for the area within park boundaries. Note that the U.S. weather station network was more stable for the period starting 1950 than for the period starting 1895. (Data: National Oceanic and Atmospheric Administration, Daly et al. 2008. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

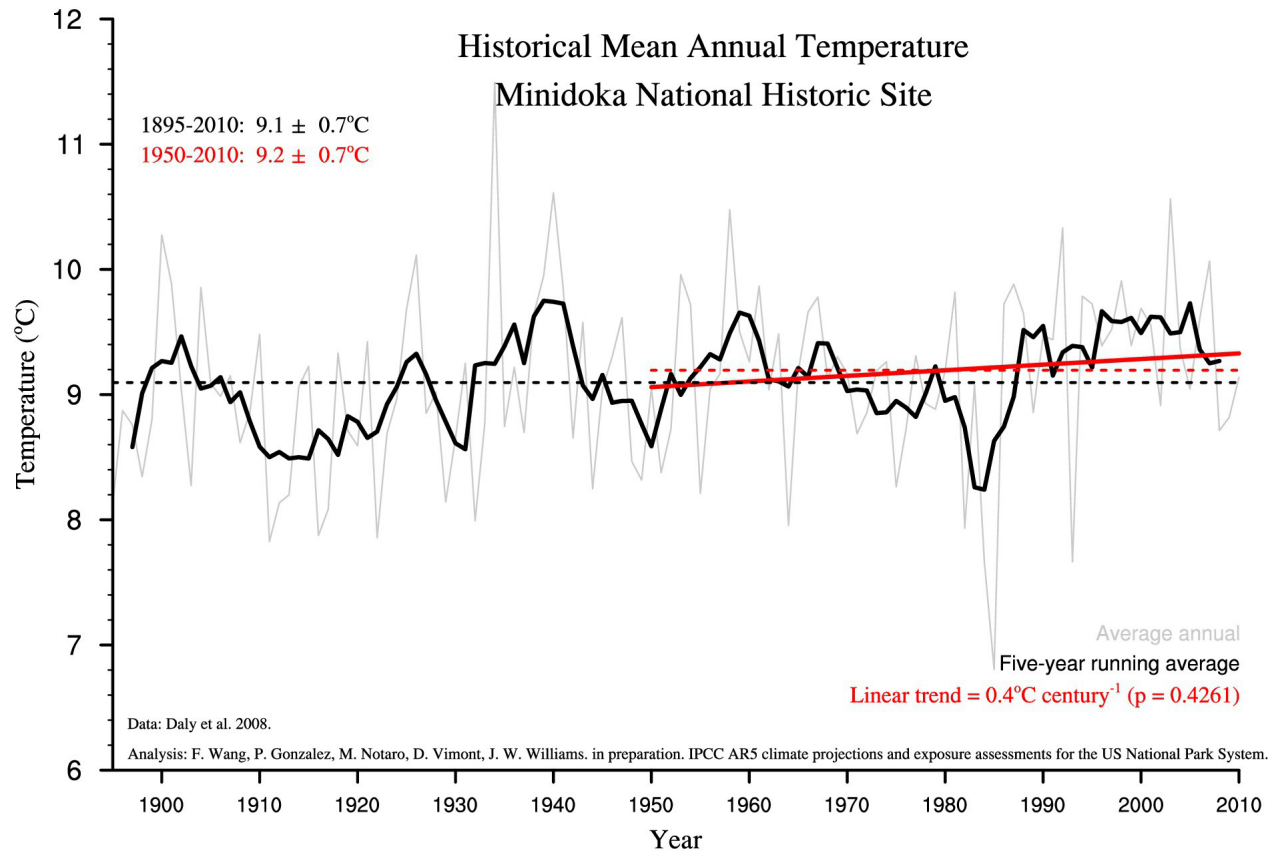


Figure 3. Historical annual total precipitation for the area within park boundaries. Note that the U.S. weather station network was more stable for the period starting 1950 than for the period starting 1895. (Data: National Oceanic and Atmospheric Administration, Daly et al. 2008. Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).

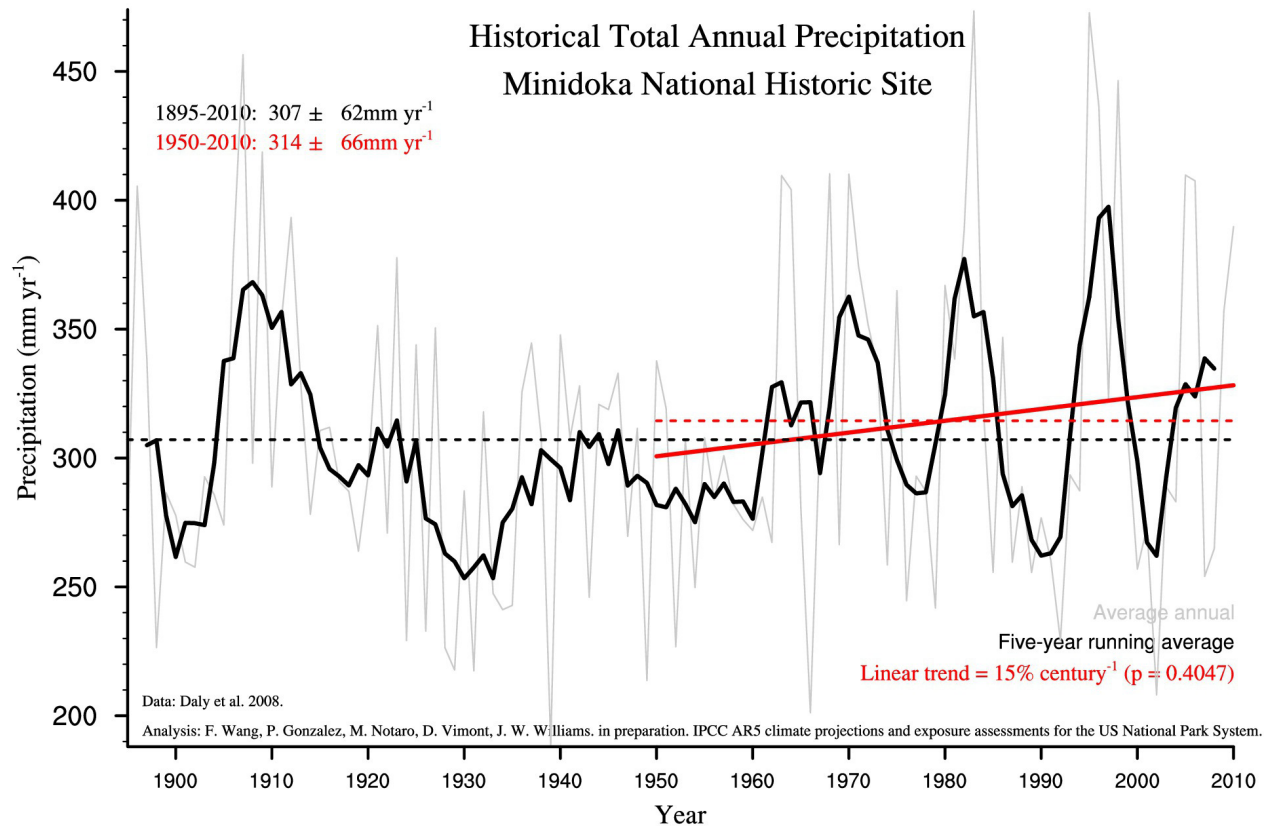
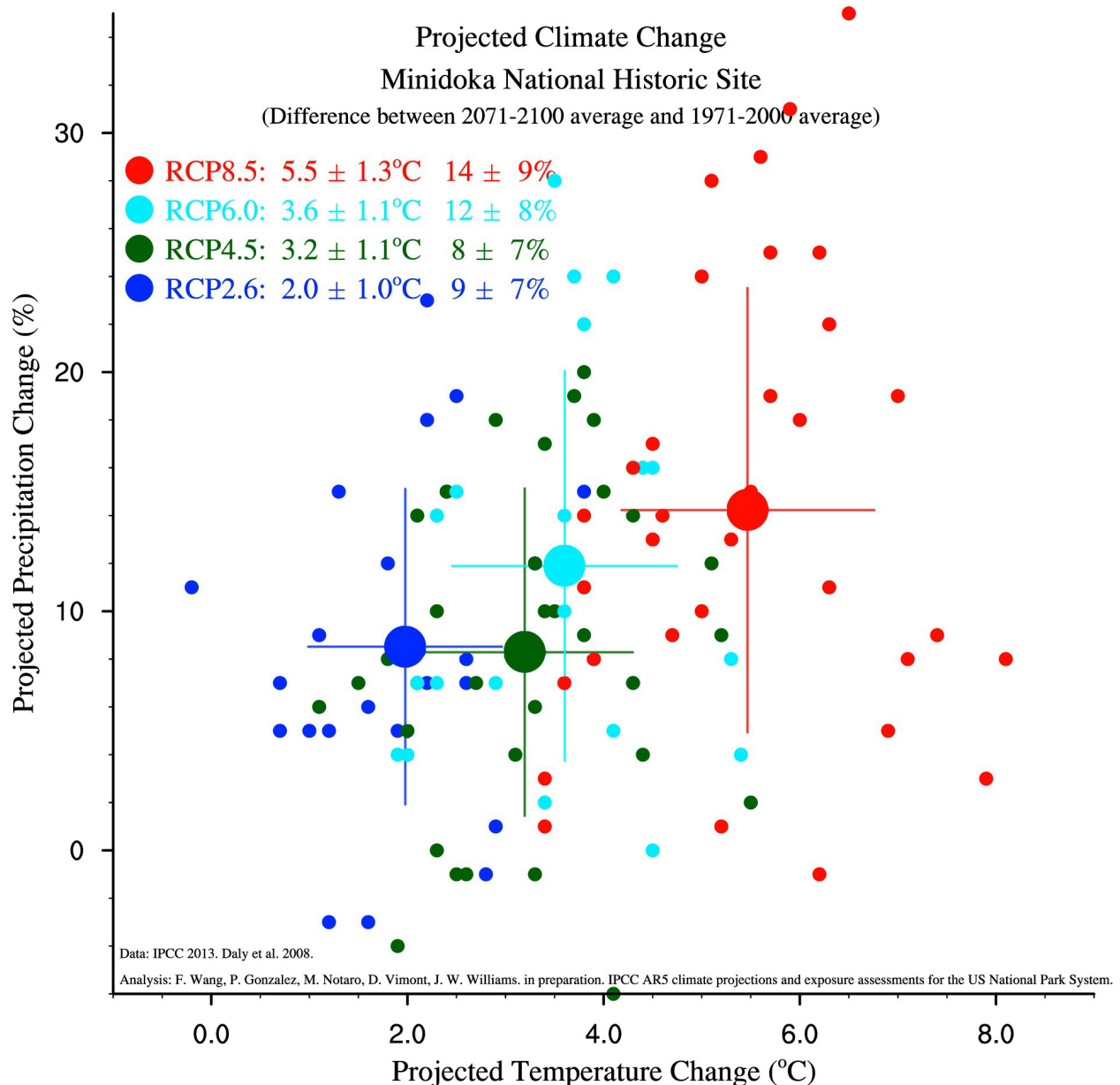


Figure 4. Projections of future climate for the area within park boundaries. Each small dot is the output of a single climate model. The large color dots are the average values for the four IPCC emissions scenarios. The lines are the standard deviations of each average value. (Data: IPCC 2013, Daly et al. 2008; Analysis: Wang et al. in preparation, University of Wisconsin and U.S. National Park Service).



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